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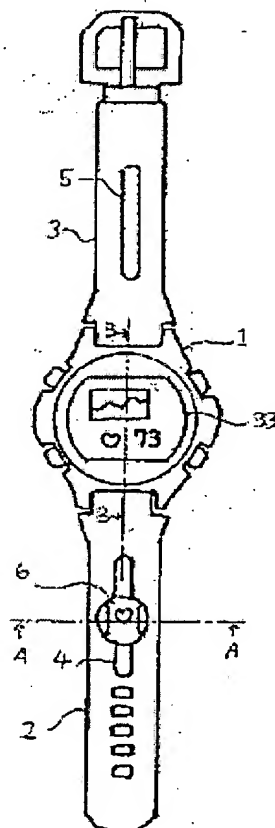
**WRIST WATCH WITH PULSE RATE MEASURING INSTRUMENT**

**Patent number:** JP2002143107  
**Publication date:** 2002-05-21  
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**Applicant:** CITIZEN WATCH CO LTD  
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**Abstract of JP2002143107**

**PROBLEM TO BE SOLVED:** To provide a wristwatch with pulse rate measuring instrument capable of changing the position of the longitudinal direction of the band of a pulse rate sensor.

**SOLUTION:** The wrist watch has bands 2 and 3 fitted to a wrist watch case 1 and extending from both of the ends of the case, fitting long holes 4 and 5 formed at the bands and extending in the longitudinal direction of the band and a sensor unit case 7 which has a pulse sensor, can be compressed and is fitted slidably at the fitting hole. The pulse sensor is connected electrically to a circuit in the wristwatch case through a signal line 22.



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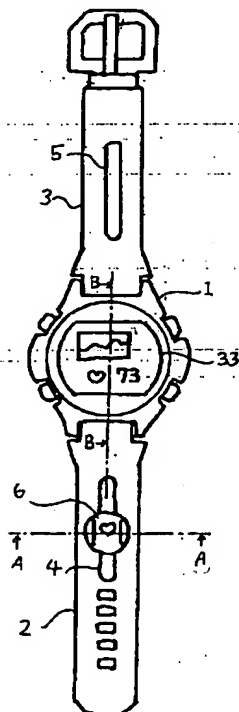
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(54) 【発明の名称】 脈拍数測定装置付腕時計

(57) 【要約】

【課題】 脈拍センサのバンド長さ方向の位置を変えることのできる脈拍数測定装置付腕時計を提供する。

【解決手段】 腕時計ケース1に取付けられケースの両端より延びるバンド2、3と、バンドに形成されバンド長手方向に延びる取付長孔4、5と、脈拍センサを有し、圧縮可能で取付長孔に摺動可能に取付けられたセンサユニットケース7を有する。脈拍センサは腕時計ケース内の回路に信号線22で電氣的に接続される。



ケース15の一对の端子16と回路基板12の端子18との間の導線17に余裕があるので、回路基板の挿入の作業を容易にしている。

【0016】回路基板12の他端の一对の端子20には接点ばね21が固定されている。接点ばね21は断面L形をなし、その各上端面に信号線ばね11の突出端が圧接している。各信号線ばね11は他端が分岐し、一方はケース7内に延長して弾性片11aとなってケース7を弾性的に拡張させている。

【0017】他方は夫々L形に屈曲して接続部11bとなってグリップ8の孔8bより露出し、バンド2内に埋込まれ孔4内に露出している一对の信号線22に夫々圧接している。この圧接によりセンサユニットケース7が孔4内に固定され、グリップ8を押すことにより圧接を緩め、ケース7を任意の位置に移動させることができる。

【0018】各バンド2、3の基部は、図3に示すように時計ケース1の裏蓋24の下まで延びて延長部25が形成され、各信号線22はバンド内を通り、延長部25迄伸び、端部においてバンド上面に露出している。一方、裏蓋24には信号線22に対向して2本の断面円形の孔29が形成され、その各孔に円筒状の防水パッキン26及びその中を貫通する導通ピン27が挿入されている。裏蓋24は防水パッキン28を介して時計ケース1に圧接しており、ケース1に固定された支持板30に導通ピン27に対向して設けられた孔に押圧ばね31が設けられ、ピン27を信号線22に圧接させている。ばね31の上端は回路基板32の端子に圧接している。

【0019】導通ピン27と信号線22及び回路基板32の回路との接続を確実にするために、延長部25の下側に補強板34がねじ35により固定され、延長部25が変形するのを防いでいる。

【0020】センサケース15内のセンサは腕時計本体から送られる電流の直流分を駆動電流として作動し、測定した脈拍数に応じた周波数の信号を出力する。そして、端子16からの出力信号は導線17、回路基板12の回路、信号線ばね11、信号線22、導通ピン27、ばね31を介して回路基板32の回路に送られ、測定された脈拍数が腕時計の表示部33に表示される。本腕時計を使用するには、時計を左腕に装着し、グリップ8を押してセンサユニットケース7を圧縮して摺動可能とし、左腕の左端にある静脈隆起部にセンサケース15が接するように孔4内を移動させてセットすればよい。腕時計を右手に着ける時は、センサユニットケース7を外し、右手用の孔5に取付ける。

【0021】

【発明の効果】本発明によれば、脈拍センサを任意の位置に移動できるので、センサを適切な位置にセットし、脈拍数を正確に測定することができる。また、左右どち

らの腕にも装着できるので、利き腕に応じて都合のよい腕に用いることができる。

【図面の簡単な説明】

【図1】本発明による腕時計の平面図である。

【図2】図1のA-A線に沿う拡大断面図である。

【図3】図1のB-B線に沿う断面図である。

【図4】信号線と時計裏蓋との接続を示す分解斜視図である。

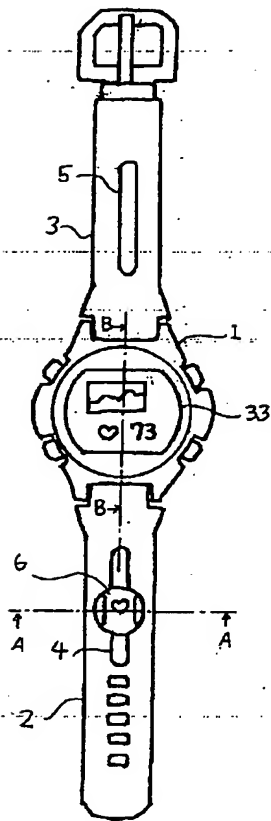
【図5】脈拍センサユニット部の平面図である。

【図6】図2のC-C線に沿う断面図である。

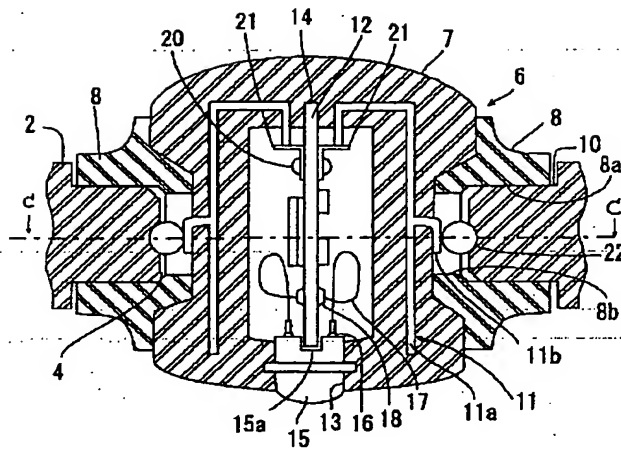
【符号の説明】

- 1 時計ケース
- 2 バンド
- 3 バンド
- 4 取付長孔
- 5 取付長孔
- 6 脈拍センサユニット
- 7 センサユニットケース
- 8 グリップ
- 8a 内面
- 8b 孔
- 10 段部
- 11 信号線ばね
- 11a 弾性片
- 11b 接続部
- 12 回路基板
- 13 孔
- 14 溝
- 15 センサケース
- 15a 溝
- 16 端子
- 17 導線
- 18 端子
- 20 端子
- 21 接点ばね
- 22 信号線
- 24 裏蓋
- 25 延長部
- 26 防水パッキン
- 27 導通ピン
- 28 防水パッキン
- 29 断面円形の孔
- 30 支持板
- 31 押圧ばね
- 32 回路基板
- 33 表示部
- 34 補強板
- 35 ねじ

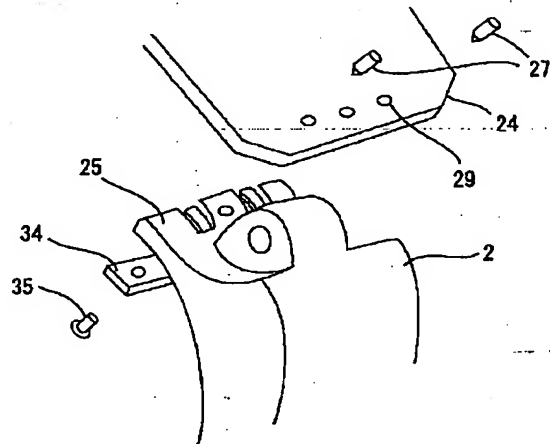
【図1】



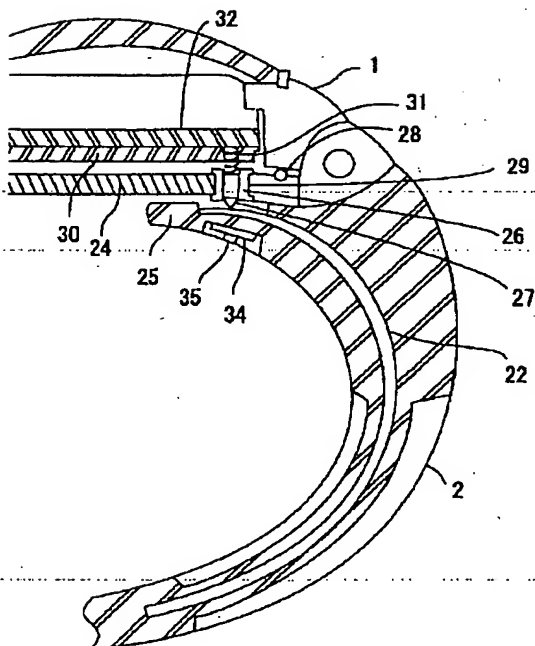
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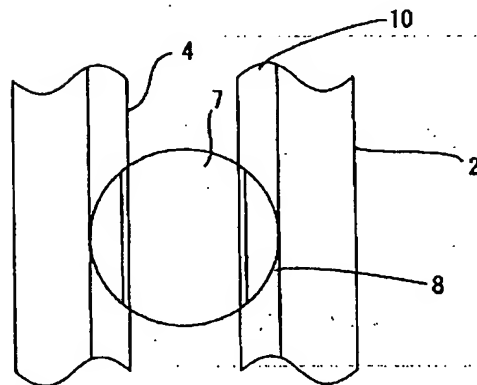
【図4】



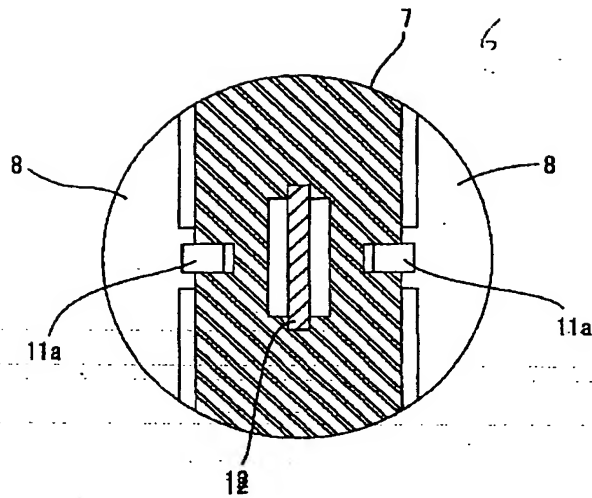
【図3】



【図5】



【図6】



フロントページの続き

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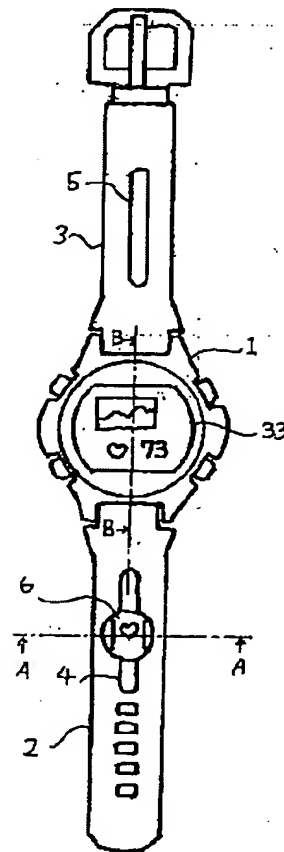
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APPLICANT : CITIZEN WATCH CO LTD;

INVENTOR : MIZUTANI YUKA;

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G04G 1/00

TITLE : WRIST WATCH WITH PULSE RATE  
MEASURING INSTRUMENT



ABSTRACT : PROBLEM TO BE SOLVED: To provide a wristwatch with pulse rate measuring instrument capable of changing the position of the longitudinal direction of the band of a pulse rate sensor.

SOLUTION: The wrist watch has bands 2 and 3 fitted to a wrist watch case 1 and extending from both of the ends of the case, fitting long holes 4 and 5 formed at the bands and extending in the longitudinal direction of the band and a sensor unit case 7 which has a pulse sensor, can be compressed and is fitted slidably at the fitting hole. The pulse sensor is connected electrically to a circuit in the wristwatch case through a signal line 22.

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## DETAILED DESCRIPTION

### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the wrist watch which can carry out the measurement display of the pulse rate, and the wrist watch which attaches a pulse sensor in the band of a wrist watch in more detail, and measures a pulse.

[0002]

[Description of the Prior Art] A pulse is measured, as a wrist watch which displays a pulse sensor on the body of a wrist watch of a wrist, a pulse sensor is attached in a breast or an arm, a pulse is measured, and what transmits pulse data to the body of a wrist watch is known.

[0003]

[Problem(s) to be Solved] The pulse sensor was in the wrist watch and the left part by the conventional approach, and wearing was troublesome. Although the problem called trouble of wearing is solvable if a wrist is equipped with a wrist watch and a pulse sensor is attached in a band, a pulse sensor is not put on a suitable location by the size of a user's arm, but there is a problem that an exact pulse rate is not obtained according to phenomena, like a measurement signal breaks off. Furthermore, when a right hand is equipped with a wrist watch, there is a problem referred to as being unable to measure a pulse.

[0004] Therefore, the first purpose of this invention is to offer the wrist watch which can measure a pulse correctly not related to the size of an arm. The second purpose of this invention is to offer the wrist watch which can measure a pulse, even when a right hand is equipped with a wrist watch.

[0005]

[Means for Solving the Problem] Invention by claim 1 is characterized by to consist of the attachment long hole which is attached in arm clock housing, is formed in the band prolonged from the both ends of a case, and a band, and is prolonged in a band longitudinal direction, a sensor unit case which has a pulse sensor and was attached compressible and possible [ sliding of an attachment long hole ], and a signal flow means to connect a pulse sensor to the circuit within arm clock housing electrically.

[0006] Invention by claim 2 is characterized by a sensor unit case being a product made of rubber in the air.

[0007] Invention by claim 3 is characterized by a signal flow means consisting of a metal wire.

[0008] Invention by claim 4 is characterized by being formed in the band part of both to which an attachment long hole extends in both from clock housing.

[0009] Invention by claim 5 is characterized by a metal wire consisting of a part embedded in the sensor unit case, and a part which contacted and was embedded in the watchband.

[0010] The part embedded in the sensor unit case consists of an elastic metal wire, and invention by claim 6 is characterized by being formed so that the case may be extended.

[0011]

[Embodiment of the Invention] It is the sectional view where the top view of the wrist watch according [ drawing 1 ] to this invention, the expanded sectional view to which drawing 2 meets the A-A line of drawing 1, the sectional view where drawing 3 meets the B-B line of drawing 1, the decomposition perspective view in which drawing 4 shows connection between a signal line and a clock back lid, and drawing 5 meet the top view of the pulse sensor unit section, and drawing 6

meets the C-C line of drawing 2.

[0012] As shown in drawing 1, the attachment long holes 4 and 5 of the band longitudinal direction for pulse sensor unit attachment are formed in the bands 2 and 3 made from plastics connected to the both sides of the case 1 of the body of a wrist watch, respectively. By the object for right-hand wearing, by illustration, as for a hole 4, the object for left-hand wearing is attached in the hole 4 for left hands, and, as for the hole 5, the pulse sensor unit 6 is attached.

[0013] As shown in drawing 2 and drawing 5, the pulse sensor unit 6 has the sensor unit case 7 of approximately cylindrical hollow, and the grip 8 of the Uichi Hidari pair in vertical one made from plastics pasted up on this by the product made of rubber. By pinching the grip 8 on either side and making the sensor unit case 7 compress by pushing on a longitudinal direction, insert a case in the hole 4 of a band, inside 8a of a grip 8 is made to engage with the step 10 formed in the band 2, and the sensor unit case 7 is attached in the band.

[0014] In the sensor unit case 7, the signal-line spring 11 of the pair of elastic metal is embedded by one at the time of shaping of a case, and, on the other hand, insertion immobilization of the circuit board 12 is carried out into the cavity of a case. Before it attaches a case 7 in the hole 4 of a band, it is inserted by extending the hole 13 of the lower part of a case, and the circuit board 12 engages with the slot 14 where upper limit was formed in the case, and by carrying out insertion immobilization of the sensor case 15 at the hole 13 of a lower limit, the lower limit of a substrate 12 is engaged at slot 15a of the sensor case 15, and it is being fixed in the sensor unit case 7.

[0015] That is, the sensor case 15 serves as both sealing of a hole 13, and support of the circuit board. In this case, since allowances are in the lead wire 17 between the terminal 16 of the pair of the sensor case 15, and the terminal 18 of the circuit board 12, the activity of insertion of the circuit board is done easy.

[0016] The contact spring 21 is being fixed to the terminal 20 of the pair of the other end of the circuit board 12. As for the contact spring 21, the protrusion edge of the signal-line spring 11 is carrying out the pressure welding of the cross-section L form to nothing and each of its upper limit side. Each signal-line spring 11 extends one side in a case 7 by the other end branching, it is set to elastic piece 11a, and the case 7 is made to extend elastically.

[0017] The pressure welding of another side is carried out to the signal line 22 of a pair which was crooked in L form, was set to connection 11b, exposed from hole 8b of a grip 8, and it was embedded in the band 2 and has been exposed in a hole 4, respectively. The sensor unit case 7 is fixed in a hole 4 by this pressure welding, by pushing a grip 8, a pressure welding can be loosened and a case 7 can be moved to the location of arbitration.

[0018] As the base of each bands 2 and 3 is shown in drawing 3, it extended under the back lid 24 of clock housing 1, and the extension 25 was formed, and each signal line 22 passed along the inside of a band, and has exposed it to a band top face in elongation and an edge to an extension 25. On the other hand, the back lid 24 is countered at a signal line 22, the hole 29 of two cross-section round shapes is formed, and the flow pin 27 which penetrates the cylinder-like waterproofing packing 26 and the inside of it to each of that hole is inserted. The pressure welding of the back lid 24 is carried out to clock housing 1 through the waterproofing packing 28, the press spring 31 is formed in the hole which countered and was prepared in the support plate 30 fixed to the case 1 at the flow pin 27, and it carries out the pressure welding of the pin 27 to a signal line 22. The pressure welding of the upper limit of a spring 31 is carried out to the terminal of the circuit board 32.

[0019] In order to ensure connection with the circuit of the flow pin 27, a signal line 22, and the circuit board 32, the back up plate 34 \*\*\*\*ed to the extension 25 down side, 35 was fixed, and it has prevented an extension 25 deforming.

[0020] The sensor within the sensor case 15 outputs the signal of the frequency according to the pulse rate which operated as a drive current and measured an in one direction flowed part of the current sent from the body of a wrist watch. And the output signal from a terminal 16 is sent to the circuit of the circuit board 32 through the circuit of lead wire 17 and the circuit board 12, the signal-line spring 11, a signal line 22, the flow pin 27, and a spring 31, and the measured pulse rate is displayed on the display 33 of a wrist watch. What is necessary is to equip the left arm with a clock, to push a grip 8, to compress the sensor unit case 7, to make sliding possible, to move the inside of a hole 4 and just to set so that the sensor case 15 may touch the vein ridge in the left end of the left arm

in order to use this wrist watch. When sticking a wrist watch to a right hand, the sensor unit case 7 is removed and it attaches in the hole 5 for right hands.

[0021]

[Effect of the Invention] According to this invention, since a pulse sensor is movable to the location of arbitration, a sensor can be set to a suitable location and a pulse rate can be measured correctly. moreover, right and left -- since both of the arms can be equipped, it can use for a convenient arm according to a dominant hand.

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CLAIMS

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[Claim(s)]

[Claim 1] The wrist watch with a pulse rate measuring device which consists of the band which is attached in arm clock housing and prolonged from the both ends of a case, the attachment long hole which is formed in a band and prolonged in a band longitudinal direction, a sensor unit case which has a pulse sensor and was attached compressible and possible [ sliding of an attachment long hole ], and a signal flow means to connect a pulse sensor to the circuit within arm clock housing electrically.

[Claim 2] The wrist watch of claim 1 characterized by a sensor unit case being a product made of rubber in the air.

[Claim 3] A signal flow means is a wrist watch with a pulse rate measuring device of claim 1 which consists of a metal wire.

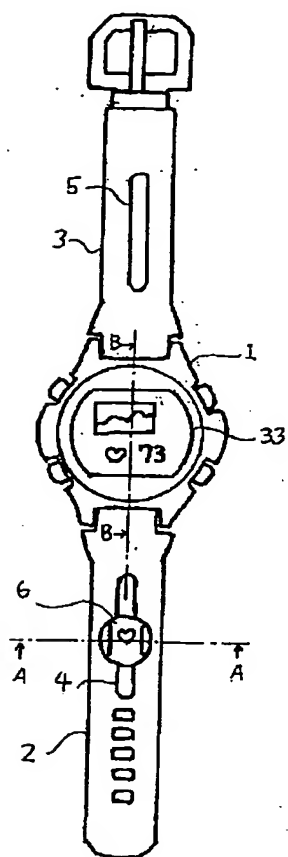
[Claim 4] An attachment long hole is the wrist watch with a pulse rate measuring device of claim 1 characterized by being formed in the band part of both which are prolonged in both from clock housing.

[Claim 5] A metal wire is a wrist watch with a pulse rate measuring device of claim 3 which consists of a part embedded in the sensor unit case, and a part which contacted this and was embedded in the watchband.

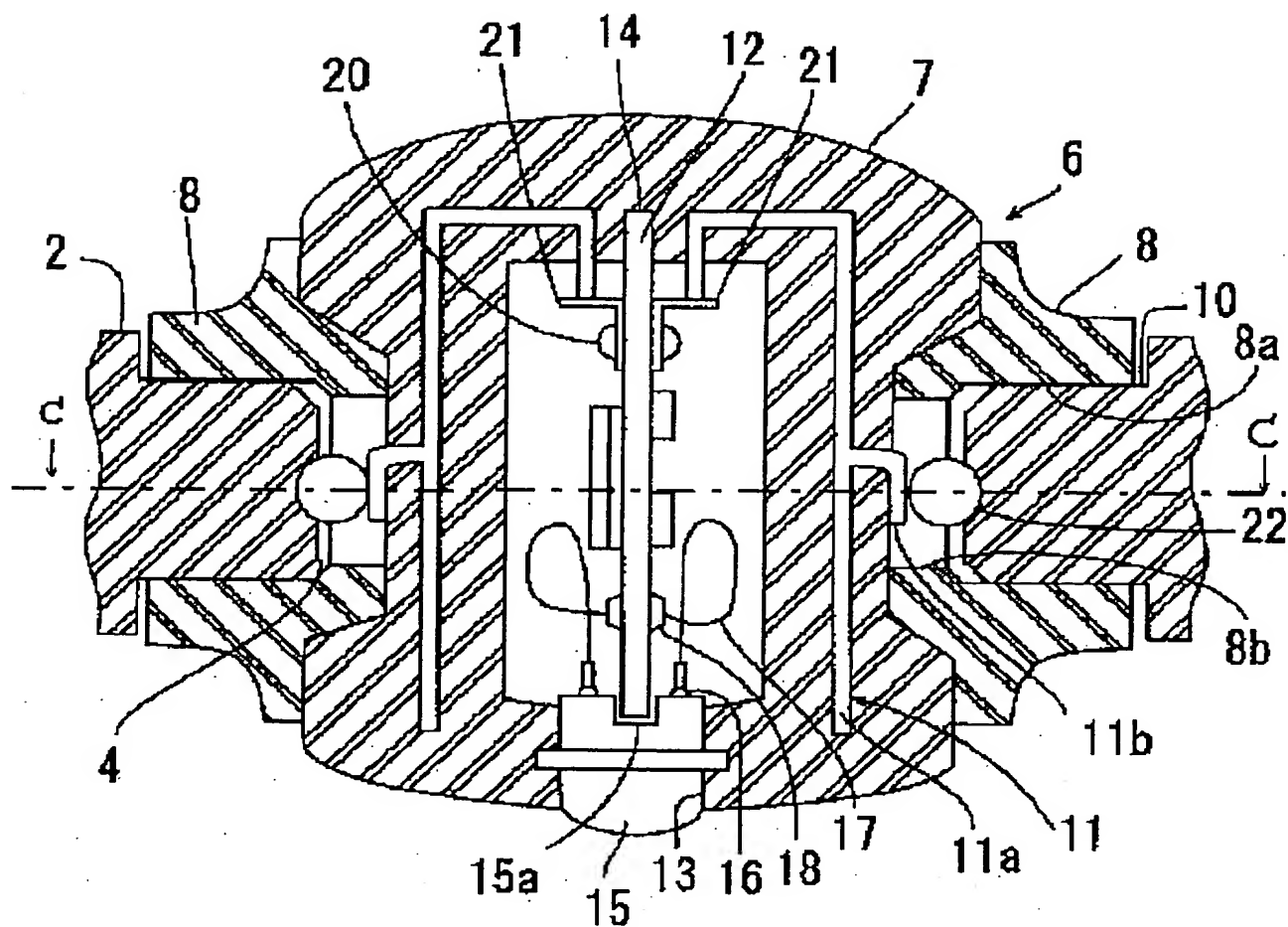
[Claim 6] The part embedded in the sensor unit case is the wrist watch with a pulse rate measuring device of claim 5 currently formed so that it may consist of an elastic metal wire and the case may be extended.

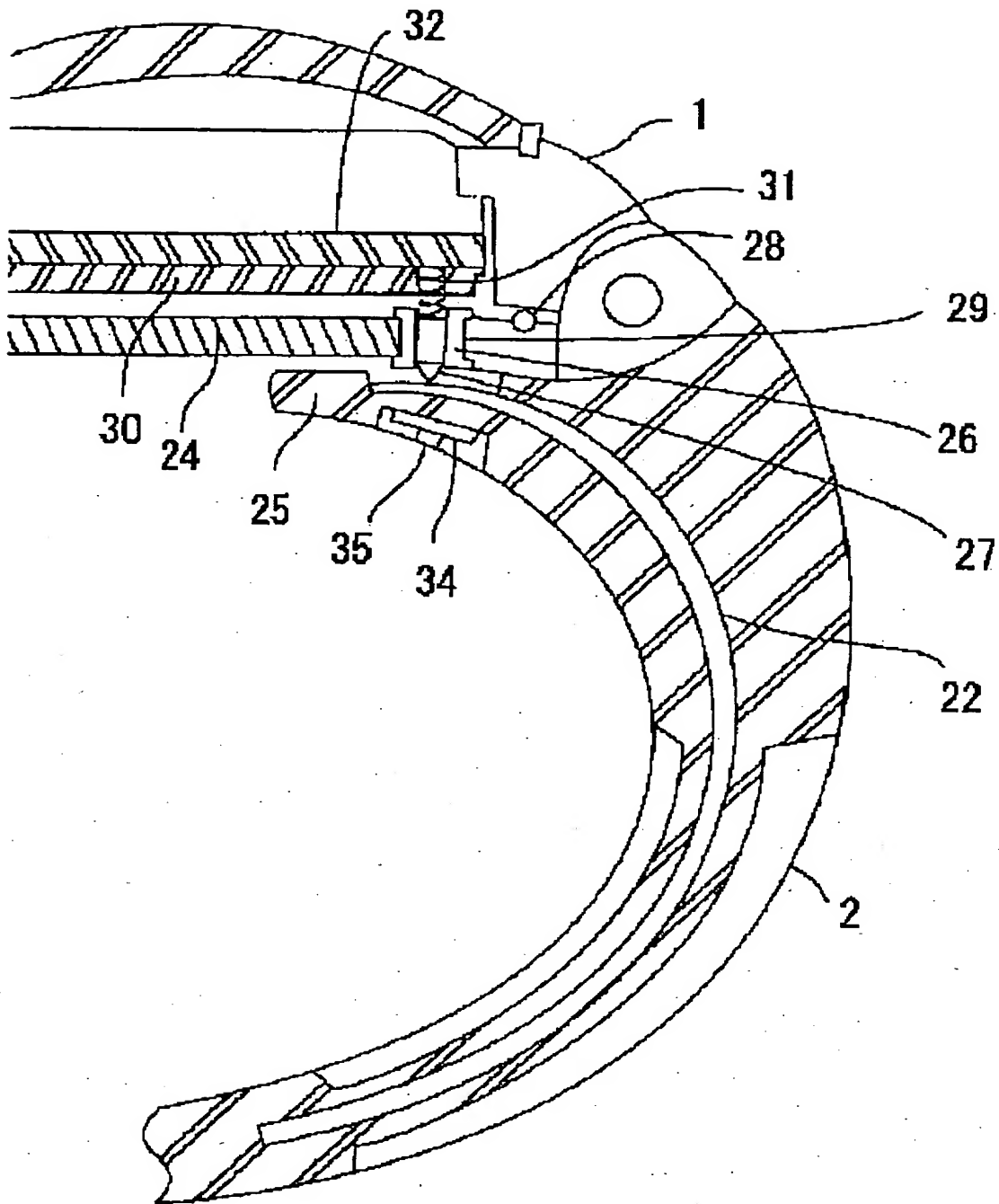
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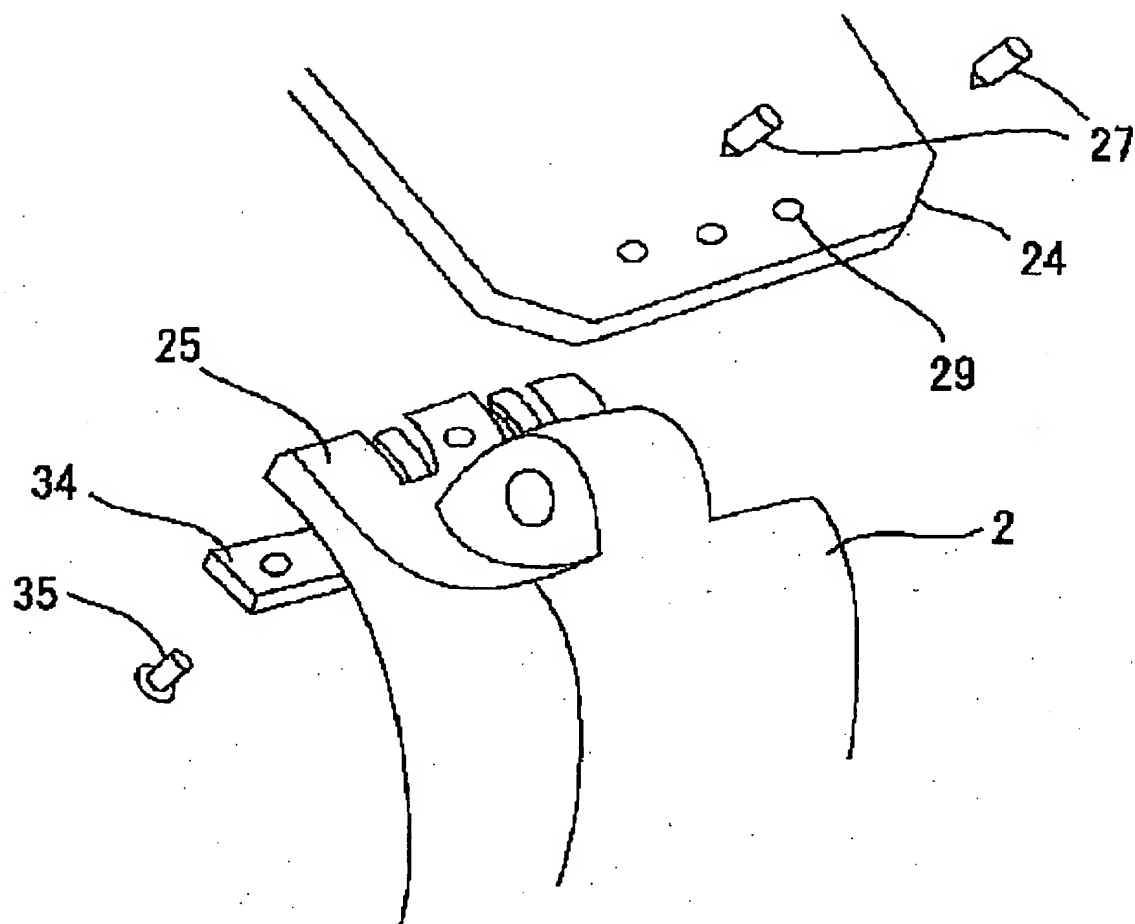
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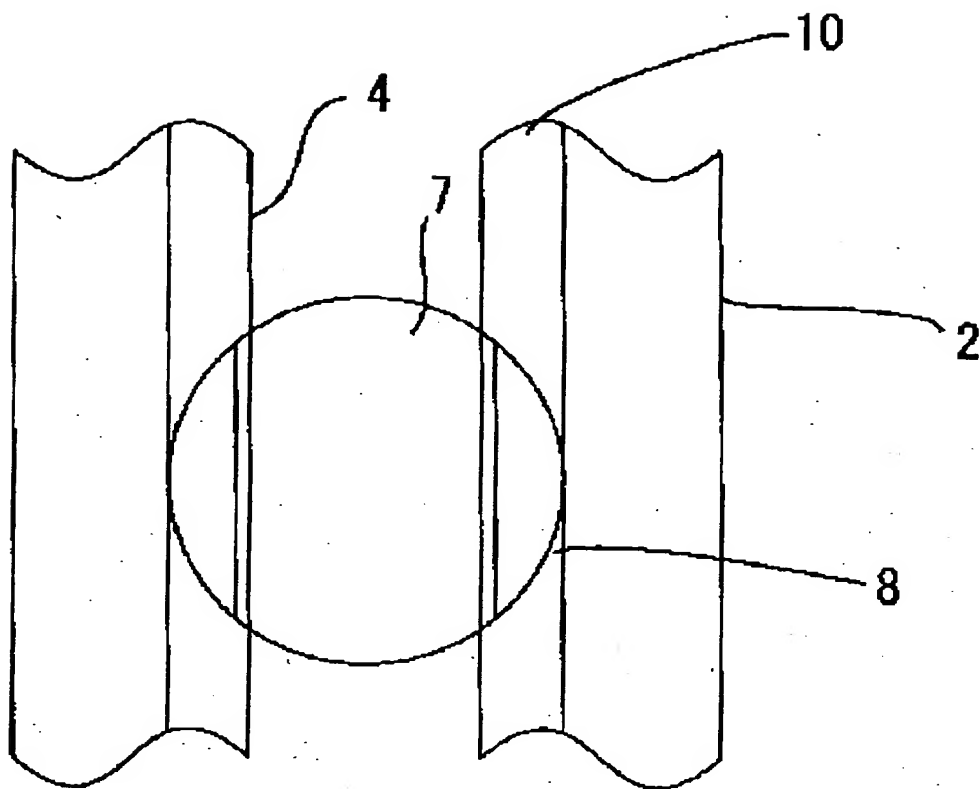
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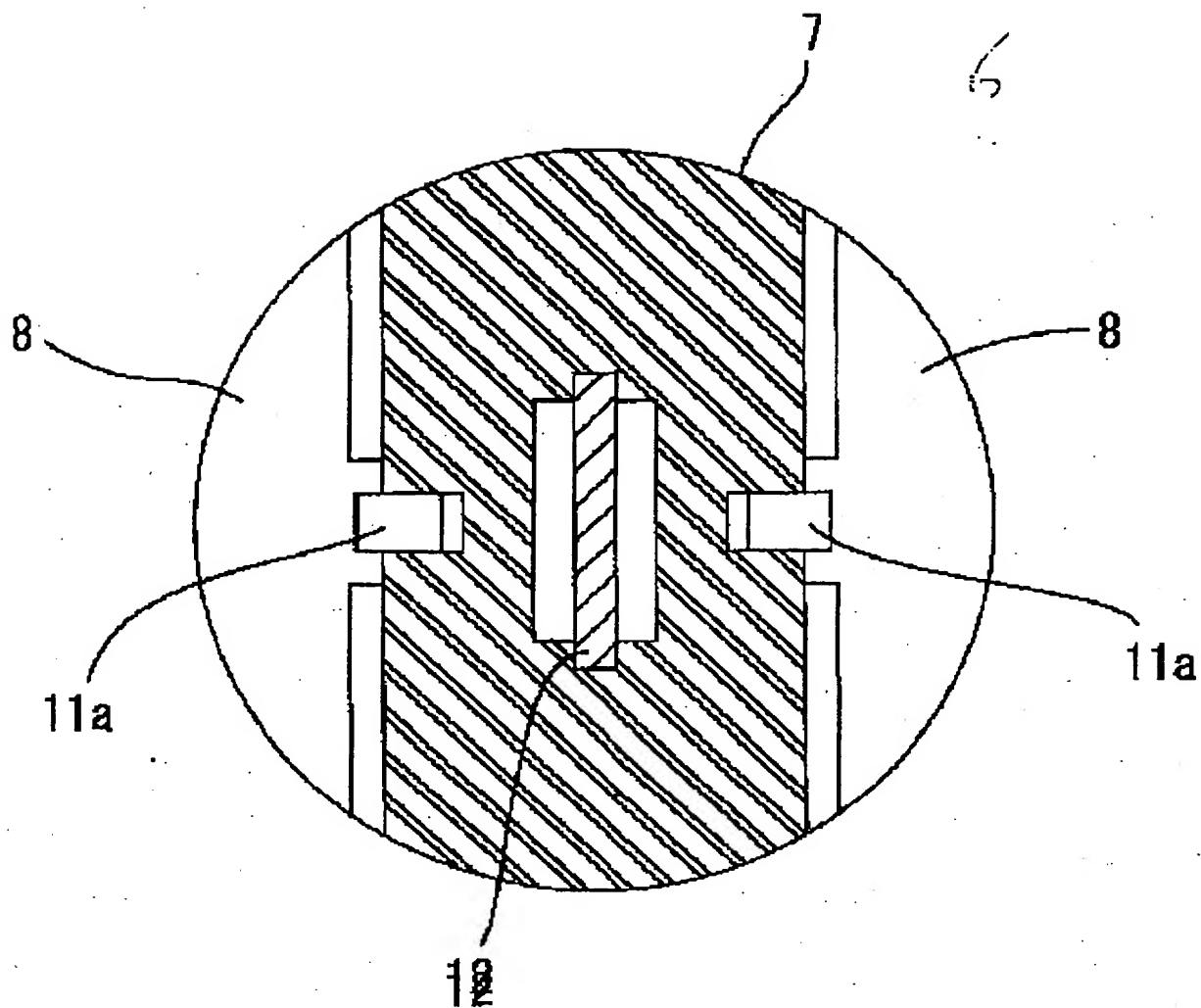












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